5-7-1951

Test 456: David Bradley Garden Tractor

The Experiment Station
University of Nebraska College of Agriculture
W. V. Lambert, Director, Lincoln, Nebraska

Department of Agricultural Engineering
Dates of test: May 7 to May 18, 1951.
Manufacturer: DAVID BRADLEY MANUFACTURING WORKS, BRADLEY, ILLINOIS
Manufacturer's rating: Not rated on drawbar, 1½ hp on belt.

NEBRASKA TRACTOR TEST NO. 456.

DAVID BRADLEY GARDEN TRACTOR

FUEL, OIL and TIME Gasoline octane No ASTM 76 Research 82 (rating taken from oil company's typical inspection data); weight per gallon 6.015 lb **Oil** SAE 30; to motor 0.134 gal; drained from motor 0.097 gal **Total time motor was operated** 33 hours.

CHASSIS Type two-wheel garden tractor **Serial No** 276 **Tread width** 16½" to 24" **Hydraulic control system** none used **Advertised speeds mph** first 2.1 second 2.4 **Belt pulley** diam 2½" V-belt pulley rpm 3200 **Clutch** spring loaded double disc clutch operated by hand lever **Seat** none **Brakes** none **Power take-off** none.

ENGINE Make Briggs and Stratton **Type** single cylinder vertical **Serial No.** 1255927 **Crankshaft mounted** crosswise **Head** L **Lubrication** splash **Bore and Stroke** 2" x 2" **Rated rpm** 3200 **Compression ratio** 5.86 to 1 **Displacement** 6.28 cu in **Port diameter valves** inlet ¾" exhaust ¾" **Governor** variable speed centrifugal **Carburetor size** ½" **Ignition system** magneto **Starting system** rope starting **Air cleaner** oil bath moss type **Muffler** was used **Oil Filter** none **Cooling medium temperature control** air cooled.

REPAIRS AND ADJUSTMENTS No repairs or adjustments.

REMARKS All test results were determined from observed data and without allowances, additions or deductions. Tests B and F were made with carburetor set for 100% maximum belt horsepower and data from these tests were used in determining the horsepower to be developed in tests D and H, respectively. Tests C, D, E, G, H, and J were made with an operating setting of the carburetor (selected by the manufacturer) of 100% of maximum belt horsepower.

BELT HORSEPOWER TESTS

Hp	Crank shaft speed rpm	Fuel Consumption: Gal per hour	Fuel Consumption: Hp-hr per gal	Fuel Consumption: Lb per hp-hour	Water used gal per hour	Temp Deg F: Cooling med	Temp Deg F: Air	Barometer inches of mercury
TESTS B AND C—100% MAXIMUM LOAD—TWO HOURS								
* 1.56	3201	0.233	6.70	0.897	—Air Cooled—		75	28.770
TEST D—RATED LOAD—ONE HOUR								
1.41	3206	0.223	6.32	0.950	—Air Cooled—		77	28.760
TEST E—VARYING LOAD—TWO HOURS (20 minute runs; last line average)								
1.42	3208	0.244	6.34	0.951	... .		78	.....
0.04	3393	0.135	0.30	2.025	... .		75	.....
0.74	3315	0.170	4.35	1.378	... .		72	.....
1.35	2700	0.219	6.16	0.978	... .		70	.....
0.37	3329	0.140	2.64	2.270	... .		68	.....
1.09	3285	0.209	5.22	1.156	... .		68	.....
0.84	3205	0.183	4.59	1.310	—Air Cooled—		72	28.750

DRAWBAR HORSEPOWER TESTS

Hp	Draw bar pull lb	Speed miles per hr	Crank shaft speed rpm	Slip of drive wheels %	Fuel Consumption: Gal per hour	Fuel Consumption: Hp-hr per gal	Fuel Consumption: Lb per hp-hr	Water used gal per hour	Temp Deg F: Cooling med	Temp Deg F: Air	Barometer inches of mercury
TESTS F AND G—100% MAXIMUM LOAD											
1.18	217	2.03	3190	4.16	Not Recorded			Air Cooled		65	28.850
1.29	207	2.33	3209	2.63	"	"		Air Cooled		67	28.940
TEST H—RATED LOAD—TEN HOURS—2nd GEAR											
1.01	160	2.36	3206	1.84	0.194	5.21	1.153	Air Cooled		81	28.835
TEST J—OPERATING MAXIMUM LOAD—2nd GEAR											
1.25	206	2.27	3212	6.67	Not Recorded			Air Cooled		76	28.930

TIRES, WHEELS AND WEIGHT

	Tests F, G, & H	Test J	Test K
Two wheels			
Type	Pressed Steel	Pressed Steel	No smaller tires suggested by manufacturer.
Liquid ballast	None	None	
Added cast iron	85 lb	None	
Tires			
No. and size	Two 6.00-16	Two 6.00-16	
Ply	2	2	
Air Pressure	6 lb	6 lb	
Height of drawbar	9 inches	9 inches	
Static weight	480 lb	311 lb	
Total weight as tested	480 lb	311 lb	

HORSEPOWER SUMMARY

	Draw-bar	Belt
1. Sea level (calculated) maximum horsepower (based on 60° F and 29.92" Hg)	1.34	1.65
2. Observed maximum horsepower (tests F and B)	1.29	1.56
3. Seventy-five per cent of calculated maximum drawbar horsepower and eighty-five per cent of calculated maximum belt horsepower (formerly ASAE and SAE ratings)	1.01	1.40

We, the undersigned, certify that this is a true and correct report of official tractor test No. 456.

L. F. Larsen
Engineer in Charge

C. W. Smith
F. D. Yung
L. W. Hurlbut
Board of Tractor Test Engineers

EXPLANATION OF TEST REPORT

TEST A: The manufacturer's representative operates the tractor for a minimum of 12 hours, using light to heavy drawbar loads in each gear. This serves as a preliminary period for limber up, general observation and adjustments. No data are recorded during this preliminary run.

BELT HORSEPOWER TESTS

TEST B: The throttle valve is held wide open and the belt load on the dynamometer is adjusted so that the engine is as near as practical to the rated speed recommended by the manufacturer. Carburetor, ignition timing and manifold adjustments are all set for maximum engine power.

TEST C: The manufacturer has an opportunity to select a more practical carburetor setting which may slightly lower the power output but give better fuel economy. As in test B, the throttle valve is held wide open and the load is adjusted to give the rated engine speed. Tests B and C may be the same, as in the case of a diesel engine where the manufacturer wants to use the same setting as in test B. The same setting is used for tests D, E, G, H, J and K.

TEST D: The throttle control lever is set so the governor will maintain rated engine speed when rated load is applied. Rated load is 85% of 100% maximum, as obtained in test B, corrected to standard conditions.

TEST E: This test serves to show how well the governor controls the engine speed when the following loads are applied: rated load, no load, ½ load, maximum load at wide-open throttle, ¼ load and ¾ load. This test also shows some significant fuel consumption results for these loads. The average fuel consumption given for this test is quite significant. The average farm tractor is subjected to a varying load condition throughout the year.

DRAWBAR HORSEPOWER TESTS

In all drawbar tests the pull exerted by the tractor is transmitted by a hydraulic pressure cylinder to a recording instrument in the test car. All tests are made on the same dirt test course which is maintained by grading, sprinkling and rolling so that it remains very nearly the same throughout the season. The same tires, wheels and weights are used for all tests except J and K.

TEST F: The tractor is operated in the gear designated by the manufacturer as rated gear (the gear recommended as most suitable for plowing). The carburetor is set as in test B. The throttle valve is held wide open and the drawbar load adjusted to maintain rated engine speed. Results of this test are used to determine the rated load for test H.

TEST G: The tractor is tested for maximum drawbar horsepower in each gear, using the more efficient carburetor setting as determined in test C. The throttle valve is held wide open and the load is applied so that the engine runs at rated engine speed. When operating in the lower gears the tractor often is unable to develop maximum horsepower because of excessive wheel slippage. Then the load is reduced until slippage approaches 16%.

TEST H: This test lasts 10 hours and is the only drawbar test where fuel consumption is measured. The load applied is 75% of 100% maximum drawbar horsepower (test F) corrected to standard conditions. The throttle lever is set so that the governor gives rated engine speed.

TEST J: The tractor is operated in rated gear with all added weight removed. This test shows the effect of the removal of added weight on the performance of the tractor.

TEST K: Similar to test J except that the smallest tires and lightest wheels recommended by the manufacturer are used.